Altitude above ground.		Mean departures.				Mean of *a* and *b* by weight.	
		a		*b*			
Meters.	*Feet.*	° *C.*	° *F.*	° *C.*	° *F.*	° *C.*	° *F.*
171	561	5.36	9.6	5.75	10.3	5.53	10.0
1,000	3,281	5.48	9.8	5.14	9.8	5.20	9.4
2,000	6,562	5.54	10.0	5.74	10.3	5.63	10.1
3,000	9,843	5.97	10.7	6.30	11.3	6.11	11.0
4,000	13,124	6.17	11.1	6.50	11.8	6.36	11.4
5,000	16,404	5.91	10.6	6.32	12.3	6.34	11.4
6,000	19,685	6.53	11.8	6.63	11.9	6.59	11.9
7,000	22,966	6.81	12.3	6.15	11.0	6.45	11.6
8,000	26,247	6.45	11.6	5.76	10.4	6.05	10.8
9,000	29,528	6.61	11.9	4.81	8.7	5.55	10.0

a Balloon ascensions between April, 1898, and the middle of February, 1899.
b Balloon ascensions between February and July, 1899.

PRELIMINARY RESULTS OF WEATHER BUREAU KITE OBSERVATIONS IN 1898.

We have already stated in the MONTHLY WEATHER REVIEW that after the preparatory work in the construction of kites and meteorographs had been brought up to a favorable condition by Prof. C. F. Marvin, it was ordered by the Chief of the Weather Bureau that a number of stations should be equipped with this apparatus and observers drilled in its use, so that the determination of atmospheric conditions over a considerable extent of country, at the height of a mile above sea level, might be carried out in a systematic manner, day by day, subject only to the omissions that necessarily occur when rain or calm prevented a kite ascension. In addition to the experimental station at Washington, sixteen others were provided for early in the year 1898, and regular observations began during the latter part of the month of April. The records for the six warmer months, May to October, inclusive, have now been partially reduced by H. C. Frankenfield, Forecast Official, and published under the title of Weather Bureau Bulletin F. Vertical Gradients of Temperature, Humidity, and Wind Direction. A Preliminary Report on the Kite Observations of 1898.

Owing to the unexpected demands suddenly precipitated upon the Bureau by the war with Spain, and the consequent immediate extension of the Weather Bureau Service over the West Indies, kite work was temporarily relinquished in November, 1898; but three stations still continue making ascensions, one daily, and two whenever possible.

As the kite undoubtedly offers the best possible method of getting at the true temperature of the atmosphere in perfectly free air, at considerable altitudes, it was especially important that the temperature observations should be promptly reduced and published. Dr. Frankenfield's report probably gives us the most extensive information available as yet as to the conditions of the atmosphere up to the height of a mile above the surface of the ground. The details of the observations and computations are given in full for the use of special students in Bulletin F, but the following general results will be of universal interest.

The Marvin kite-meteorograph keeps a continuous record of pressure, temperature, moisture, and wind velocity, but the adopted plan of observation included frequent additional special observations of the apparent angular elevation of the kite and the length of wire paid out from the reel, whence the true altitude can be computed without depending upon the barograph record. Observations of this kind were made as nearly as practicable at each 500 feet of altitude, while at the same time the rate of ascent or descent of the kite was temporarily checked, so that the thermometer might certainly come to the temperature of the wind at that elevation. These special observations are the only ones discussed in Bulletin F; they usually began early in the morning, but in the case of high ascensions they necessarily lasted over until the afternoon; very rarely were two ascensions made in one day. The mean of the morning and afternoon series generally corresponded to about 10 or 11 a. m., and it is these means that are now reprinted from Dr. Frankenfield's work, to which we must refer for the separate results. The total number of ascensions discussed by him amount to 1217, and the total number of observations of each element, not including those at the ground, amounted to 3,835. The distribution of the ascensions and altitudes is shown in Tables 1 and 2.

TABLE 1.—*Summary of stations and observations.*

Stations.	Elevation above sea level.	No. of months observations.	No. of kite ascensions.	Number of observations at the respective altitudes above ground. 1,000 feet.	1,500 feet.	2,000 feet.	3,000 feet.	4,000 feet.	5,000 feet.	6,000 feet.	7,000 feet.	8,000 feet.	Total.
Washington	115	5.0	87	51	52	53	28	19	9	7	3	1	223
Cairo	315	5.5	39	6	33	31	23	19	4	....	.....	.....	116
Cincinnati	940	5.0	38	3	7	24	19	16	9	3	.....	.....	81
Fort Smith	527	5.0	19	12	18	18	8	2	.....	.....	.....	.....	58
Knoxville	990	5.0	19	8	8	8	8	2	.....	.....	.....	.....	34
Memphis	319	4.3	37	16	22	27	26	21	5	.....	.....	.....	117
Springfield, Ill.	684	5.0	46	15	52	53	28	15	9	2	.....	.....	174
Cleveland	705	5.0	93	29	62	55	48	21	11	1	.....	.....	227
Duluth	1,197	5.5	96	61	71	83	60	32	13	5	.....	.....	325
Lansing	869	5.0	58	23	23	22	34	22	10	.....	.....	.....	134
Sault Ste. Marie	722	5.3	74	7	42	46	39	31	15	.....	.....	.....	180
Dodge	2,473	6.0	138	119	123	118	106	66	28	10	2	1	573
Dubuque	894	5.7	65	19	32	40	35	15	7	.....	.....	.....	148
North Platte	2,811	6.0	132	70	162	133	102	44	13	1	.....	.....	525
Omaha	1,241	4.5	61	0	29	50	45	34	19	6	2	.....	185
Pierre	1,595	5.5	134	96	105	91	65	38	19	2	.....	.....	416
Topeka	972	6.0	81	68	65	76	72	26	11	1	.....	.....	319
Total	....	.....	1,217	603	906	928	746	423	182	38	7	2	3,835

TABLE 2.—*Mean temperature gradients from the ground up to the respective altitudes and the number of observations.*

Stations.	1,000 feet.	1,500 feet.	2,000 feet.	3,000 feet.	4,000 feet.	5,000 feet.	6,000 feet.	7,000 feet.	8,000 feet.	Total No. of observations.
	°	°	°	°	°	°	°	°	°	
Washington, D. C.	5.6	4.4	4.0	3.5	3.2	3.0	3.1	3.0	3.0	
	51	52	53	28	19	9	7	3	1	223
Cairo, Ill.	9.7	6.6	6.0	4.9	4.7	4.8	......	.....	......	
	6	33	31	23	19	4	......	......	......	116
Cincinnati, Ohio	13.0	6.3	6.9	5.8	5.6	4.7	4.2	......	......	
	3	7	24	19	16	9	3	......	......	81
Fort Smith, Ark	7.2	7.0	6.7	5.8	3.8	......	......	......	......	
	12	18	18	8	2	.....	......	......	......	58
Knoxville, Tenn.	8.4	6.2	6.6	5.4	5.0	......	......	......	......	
	8	8	8	8	2	......	......	......	......	34
Memphis, Tenn	7.8	6.8	5.0	3.8	3.7	3.5	.....	......	......	
	16	22	27	26	21	5	......	......	......	117
Springfield, Ill	7.6	5.7	5.1	4.4	4.0	3.7	3.6	......	......	
	15	52	53	28	15	9	2	......	......	174
Cleveland, Ohio	5.7	4.1	3.6	3.5	4.1	4.1	4.3	......	......	
	29	62	55	48	21	11	1	......	......	227
Duluth, Minn	5.2	4.8	4.6	4.6	4.3	3.8	4.6	......	.....	
	61	71	83	60	32	13	5	......	.....	325
Lansing, Mich	7.5	6.0	4.7	4.1	3.9	3.8	......	......	......	
	23	23	22	34	22	10	......	......	......	134
Sault Ste. Marie, Mich	6.6	6.2	5.2	4.5	3.9	3.0	......	......	.....	
	7	42	46	39	31	15	......	......	......	180
Dodge, Kans.	6.3	5.2	4.8	3.7	3.1	3.2	3.2	3.2	4.9	
	119	123	118	106	66	28	10	2	1	573
Dubuque, Iowa	6.9	5.9	4.6	3.5	3.2	3.3	......	......	......	
	19	32	40	35	15	7	.....	......	......	148
North Platte, Nebr.	6.8	6.5	5.9	5.2	4.4	4.7	5.4	......	......	
	70	162	133	102	44	13	1	......	......	525
Omaha, Nebr	......	5.4	4.9	3.6	3.2	3.5	3.8	4.1	......	
	.....	29	50	45	34	19	6	2	.....	185
Pierre, S. Dak	5.9	5.1	4.8	4.3	3.7	4.4	4.0	......	......	
	96	105	91	65	38	19	2	......	......	416
Topeka, Kans.	7.4	6.2	4.9	4.0	3.8	3.9	4.5	......	.....	
	68	65	76	72	26	11	1	......	.....	319
Mean	7.4	5.8	5.2	4.4	4.0	3.8	4.1	3.4	4.0	
	603	906	928	746	423	182	38	7	2	3,835

TABLE 3.—*Mean decrease of temperature from the ground up to the respective altitudes.*

	1,000 ft.	1,500 ft.	2,000 ft.	3,000 ft.	4,000 ft.	5,000 ft.	6,000 ft.	7,000 ft.	8,000 ft.
	°	°	°	°	°	°	°	°	°
Morning	7.2	5.5	4.8	4.0	3.7	3.7	3.9	3.4	3.0
Afternoon	7.5	6.4	6.0	5.5	4.9	4.3	4.5	3.5	4.9
Mean	7.4	5.8	5.2	4.4	4.0	3.8	4.1	3.4	4.0

TABLE 4.—*Mean decrease of temperature by geographical districts.*

Districts.	1,000 feet.	1,500 feet.	2,000 feet.	3,000 feet.	4,000 feet.	5,000 feet.	6,000 feet.	7,000 feet.	8,000 feet.	No. of stations.	Ascensions.	Observations.
	°	°	°	°	°	°	°	°	°			
Atlantic coast	5.6	4.4	4.0	3.5	3.2	3.0	3.1	3.0	3.0	1	87	223
Central Mississippi watershed	9.0	6.4	6.0	5.0	4.5	4.0	3.9	......	......	6	198	580
Upper Lake region...	6.2	5.3	4.5	4.2	4.1	3.7	4.4	4.0	......	4	321	866
Central west.........	6.6	5.7	5.0	4.0	3.6	3.8	4.2	3.6	4.9	6	611	2,166
										17	1,217	3,835

At the present stage of its development, the Weather Bureau kite, having 68 square feet of supporting surface, can not be depended upon to carry up the Marvin meteorograph, weighing 2.2 pounds avoirdupois, unless the wind blows at the rate of 10 miles per hour. These present observations, therefore, do not relate to calm weather, such as prevails in the central portion of an area of high pressure; neither do they relate to the stormy and rainy weather within an area of low pressure, except in a few rare cases; but, in general, they do fairly represent the condition of the atmosphere in all intermediate stages. The percentage of actual to total possible ascensions varied from 75 at Dodge to 12 at Knoxville.

The observed temperatures are not published in this bulletin, but the individual rates of change from the ground up to any given altitude are all given, so that local gradients may be deduced and studied.

In Tables 2, 3, and 4 we have given the most general results, such as may be supposed to represent the annual average condition of the atmosphere. The means at the bottom of Tables 2 and 3 apply in a general way to the average for the six warm months over the entire territory between latitudes 35°–50° N. and longitudes 75°–100° W. Some such general means as these are needed in computing the general reduction of surface temperatures and pressures to the upper 1-mile level in order that we may compare the isobars and isotherms deduced from observations at the surface of the earth with those that are based upon records obtained by the kite meteorograph. Doubtless the actual observed temperatures and pressures for these kite ascensions, as well as the upper and lower reduced values, will be published at some future time.

The inversions of temperature on many occasions were quite appreciable. These cases were evenly distributed through the six months, and extended up to 1,500 feet in the early morning in some cases. In general, strong inversions took place with light southerly winds, but slight inversions with strong northerly winds. The presence of clouds diminished the fall of temperature greatly, and in some cases was accompanied by a decided rise of temperature. Dr. Frankenfield's summaries give the gradients for both the morning and afternoon observations separately, as also for clear and cloudy weather. He has also given the cases of inversion in detail.

In using the temperature gradients here given, the reader will recall that the figures represent the differences between the temperature at any specified height and that at the ground, divided by the height expressed in units of 1,000 meters. These quotients, therefore, are the average gradients throughout each such column from the ground up to any given height. They can not properly be supposed to hold good for the middle point of each column unless the diminution of temperature follows a very simple law. If we desire to know the average gradient at the center of any column 1,000 feet in height, we must reconstruct the curve of temperature and measure off the local gradient at the desired altitude.

The altitudes stated at the top of each column are supposed to be measured from the ground upward and not from sea level; therefore, in order to obtain the gradient at any point above sea level one must consider the altitude of the ground given in Table 1. This has been attempted by the Editor in Table 5, which gives the average distance from each station up to the stratum that is 1 mile above sea level, and the average gradient of temperature from the ground up to that level. It also gives the resulting reduction to be applied to the surface temperature in order to reduce it upward to that level, which, however, is strictly applicable only to the general average of the six months of observation. One-half of this reduction is the argument for obtaining the temperature correction for use in reducing surface pressures for the 1-mile level. Finally, the table gives the average temperature gradient at the 1-mile level for each of the seventeen kite stations.

TABLE 5.

Districts and stations.	Altitude of ground at reel.	Depth below 1-mile level.	Average gradient up to 1-mile level.	Reduction from ground to 1-mile level.	Correction to ground temperature to get column temperature.	Average gradient at the 1-mile level.
Atlantic coast.	*Feet.*	*Feet.*	°	°	°	°
Washington, D. C..........	115	5,165	—3.00	—15.5	— 7.8	—3.0
Central Mississippi Valley.						
Cairo, Ill	315	4,965	—4.30	—25.6	—12.8	—4.3
Cincinnati, Ohio	940	4,340	—5.15	—27.5	—13.8	—5.3
Fort Smith, Ark	527	4,753	....	....	....	....
Knoxville, Tenn	990	4,290	—5.00	—21.5	—10.8	—4.9
Memphis, Tenn	319	4,961	—3.50	—17.3	— 8.6	—3.5
Springfield, Ill.............	684	4,596	—3.85	—17.7	— 8.8	—3.8
Upper Lakes.						
Cleveland, Ohio	705	4,575	—4.10	—18.8	— 9.4	—4.1
Duluth, Minn	1,197	4,083	—4.30	—17.6	— 8.8	—4.3
Lansing, Mich	869	4,411	—3.85	—17.0	— 8.5	—3.9
Sault Ste. Marie, Mich.....	722	4,558	—3.45	—15.7	— 7.8	—3.5
Central west.						
Dodge City, Kans..........	2,473	2,807	—4.10	—11.6	— 5.8	—3.9
Dubuque, Iowa...........	894	4,386	—3.30	—14.5	— 7.2	—3.2
North Platte, Nebr........	2,811	2,469	—5.40	—13.3	— 6.6	—5.5
Omaha, Nebr	1,241	4,039	—3.20	—12.9	— 6.4	—3.2
Pierre, S. Dak	1,595	3,685	—3.90	—14.4	— 7.2	—3.9
Topeka, Kans..............	972	4,308	—3.88	—16.5	— 8.2	—3.8

In Table 6 we have made an attempt to determine for the warm season the gradient at the middle point of each thousand feet of altitude. In order to do this, the average gradient from the ground up to any altitude, being multiplied by this altitude, gives the figures in the column headed "Total fall of temperature." The next following column gives the differences between these successive diminutions expressed as gradients per thousand feet. These gradients hold good approximately for the middle of each layer. One might interpolate midway between them in order to obtain the gradients at every 500-foot level, but the irregularities apparent in these figures suggest caution in this process.

TABLE 6.

Altitude above ground, feet.	Average gradient from the ground.	Number of observations.	Total fall in temperature.	Gradient per 1,000 feet at each level.
	°		°	°
8,000	— 4.0?	2	—32.0?	....
7,500	....	....	....	— 8.2?
7,000	— 3.4?	7	—23.8?	....
6,500	....	....	....	+ 0.8?
6,000	— 4.1	38	—24.6	....
5,500	....	....	....	— 5.6
5,000	— 3.8	182	—19.0	....
4,500	....	....	....	— 3.0
4,000	— 4.0	423	—16.0	....
3,500	....	....	....	— 2.8
3,000	— 4.4	746	—13.2	....
2,500	....	....	....	— 2.8
2,000	— 5.2	928	—10.4	....
1,750	....	....	....	— 3.4
1,500	— 5.8	906	— 8.7	....
1,250	....	....	....	— 2.6
1,000	— 7.4	603	— 7.4	....
500	....	....	....	— 3.7
0	....	3,835	— 0.0	....

The relative humidity was recorded by means of a special form of hair hygrometer, and this, combined with the temperature, gave the vapor pressure computed for each observation. The average relative humidity is given in Table 7. The ratio of the vapor pressure at any upper altitude to that at the earth's surface is given in Table 8. The results of work with balloons and kites are compared in Table 9, and give a remarkable confirmation of Hann's well-known formula.

TABLE 7.—*Mean relative humidity.*

[S=at ground, A=above.]

Stations.	1,500 ft.		2,000 ft.		3,000 ft.		4,000 ft.		5,000 ft.		6,000 ft.		7,000 ft.		8,000 ft.	
	S	A	S	A	S	A	S	A	S	A	S	A	S	A	S	A
Washington	76	68	75	67	77	64	75	61	80	60	78	66	73	59	79	58
Cairo	68	67	65	66	63	64	62	62	60	65	....	....	...	....	....	...
Cincinnati	70	67	65	68	64	63	66	68	65	64	63	70	....	....	....	....
Fort Smith	63	72	63	76	63	82	71	79	....	....	....	...	....	....	....	....
Knoxville	55	63	61	71	72	75	64	64	....	....	....	....	...	...	...	....
Memphis	59	70	67	77	72	77	69	69	60	62	....	....	....	....	....	....
Springfield, Ill	61	45	60	42	57	36	46	24	53	26	50	24	....	....	....	....
Cleveland	74	71	74	72	73	72	69	65	69	75	78	94	....	....	...	....
Duluth	70	72	66	69	60	65	62	64	61	57	58	57	54	70	....	....
Lansing	78	69	76	68	72	69	61	68	65	64	. .	...	...	....	...	....
Sault Ste. Marie	80	71	73	69	73	69	63	68	59	73	....	....	....	....	....	....
Dodge	57	52	57	58	55	56	52	42	48	51	45	50	32	42	22	47
Dubuque	70	73	72	73	65	66	66	58	67	71	....	....	....	....	....	....
North Platte	53	56	51	56	47	53	46	52	42	49	30	60	....	....	....	...
Omaha	48	40	50	40	49	33	53	30	62	24	67	15	66	10	....	...
Pierre	57	63	56	61	55	66	52	60	43	58	48	64	....	.. .	....	....
Topeka	61	69	62	67	63	64	60	59	62	61	63	63	....	....	....	...
Means	65	64	64	65	64	63	61	58	60	57	58	56	56	45	50	52

TABLE 8.—*Vapor pressure.*

Diminution with altitude $\left(\frac{p}{p_0}\right)$.

Stations.	1,500 feet.	2,000 feet.	3,000 feet.	4,000 feet.	5,000 feet.	6,000 feet.	7,000 feet.	8,000 feet.
Washington, D. C.	0.87	0.82	0.66	0.60	0.54	0.46	0.45	0.34
Cairo, Ill	0.71	0.69	0.63	0.54	0.54	......	.....	......
Cincinnati, Ohio	0.73	0.69	0.57	0.51	0.49	0.45	......	......
Fort Smith, Ark	0.82	0.79	0.74	0.65	......	.....	......	......
Knoxville, Tenn	0.83	0.73	0.66	0.76	.....	......	......	......
Memphis, Tenn	0.88	0.86	0.76	0.61	0.54	......	......	......
Springfield, Ill	0.74	0.70	0.63	0.52	0.48	0.49	......	......
Cleveland, Ohio	0.83	0.77	0.68	0.55	0.55	0.48	......	......
Duluth, Minn	0.82	0.79	0.74	0.64	0.57	0.56	0.45	......
Lansing, Mich	0.87	0.83	0.73	0.56	0.51	......	......	......
Sault Ste. Marie, Mich	0.83	0.76	0.71	0.71	0.44	......	.....	......
Dodge, Kans	0.85	0 84	0.80	0.71	0.61	0.56	0.51	0.55
Dubuque, Iowa	0.83	0.79	0.76	0.56	0.56	......	......	......
North Platte, Nebr	0.78	0.72	0.66	0.57	0.40	0.65	......	......
Omaha, Nebr	0.83	0.80	0.68	0.56	0.39	0.23	0.15	......
Pierre, S. Dak	0.90	0 86	0.75	0.72	0,69	0.69	......	......
Topeka, Kans	0.85	0.80	0.68	0.56	0.52	0.36	......	......
Mean	0.82	0.78	0.70	0.61	0.52	0.49	0.39	0.44

TABLE 9.—*Decrease of vapor pressure with altitude.*

Value of $\left(\frac{p}{p_0}\right)$ for the respective altitudes.

Character of observations.	1,500 feet.	2,000 feet.	3,000 feet.	4,000 feet.	5,000 feet.	6,000 feet.	7,000 feet.	8,000 feet.	No. of observations.
Kites	0.82	0.78	0.70	0.61	0.53	0.49	0.39	0.44	1,123
Balloons (Hammon)	0.96	0.96	0.87	0.68	0.44	0.59	......	......	4*
Balloons (Hazen)	0.89	0.83	0.80	0.78	0.67	0.46	0.44	......	2*
Balloons (Hann)	0.84	0.80	0.66	0.61	0.50	0.54	0.41	0.37	15†
Mountains (Hann)	0.83	0.81	0.80	0.66	0.61	0.58	0.55	0.47	6†
Computed by Hann's formula.	0.85	0.81	0.72	0.65	0.58	0.52	0.47	0.42	......

*American Meteorological Journal. †Meteorologische Zeitschrift, IX, 1874.

The velocity of the wind was not recorded, owing to the fact that the small and light anemometer designed to accompany the meteorograph could not be completed and tested in time for use.

The direction of the wind at any elevation is almost exactly given by the azimuth of the kite. A general study of these directions is given by Dr. Frankenfield in connection with each station, and may be summarized as follows:

The upper winds show an increase in velocity and a slight progressive deflection toward the right, increasing with the altitude, and rarely exceeding 90°. In the few cases of deflection toward the left, the velocity of the wind, as shown by the pull on the kite wire, diminished with increase of altitude. In a slight majority of these cases of deflection toward the left, rain followed within a few hours. The diurnal changes of the upper and lower winds were strongly marked at Duluth.

THE AVERAGE TEMPERATURE OF THE ATMOSPHERE.

When a long and complete series of observations with sounding balloons and kites becomes available, we may determine with great accuracy the normal temperature of the atmosphere over any station for each thousand meters of altitude up to great heights. Meanwhile, however, the diagram given by Teisserenc de Bort in an article that we have translated and published on page 412 tempts us to make a first approximation to this fundamental datum in dynamic meteorology. We can, however, only reason cautiously upon the data given by himself as the results of systematic work at Trappes, near Paris. As a first approximation, the Editor offers the mean monthly temperatures and annual averages given in Table 1, as representing an average year between April, 1898, and July, 1899. This is a rather bold and hazardous attempt at generalization, but when we consider that according to his own statement, the mean departure of the temperature from the mean at any given altitude in all types of weather, ranges from 5.2° nearest the ground to 6.6° C. at 6,000 meters, we see at once that the annual averages given in this table have some slight value as an approximation to the normal, provided no systematic instrumental errors intervene. Better figures will doubtless be given by the author himself at some future date.

TABLE 1.—*Approximate mean temperatures (Centigrade) observed in free air at Trappes during* 1898–99.

Altitude (kilometers).	January.	February.	March.	April.	May.	June.	July.	August.*	September.	October.	November.	December.	Annual mean.	Means of departures. Daily observations.	Monthly means.
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
10	−50	−55	−55	−55	−68	−44	−45	(−45)	−45	−55	−55	−50	−51	......	4.8
9	−45	−45	−50	−45	−50	−38	−35	(−35)	−36	−45	−45	−40	−42	5.6	4.8
8	−35	−39	−44	−39	−40	−31	−28	(−28)	−28	−40	−40	−35	−38	6.0	4.8
7	−30	−31	−40	−32	−32	−23	−21	(−21)	−22	−30	−33	−30	−29	6.4	4.6
6	−25	−26	−32	−25	−24	−14	−15	(−14)	−18	−20	−25	−23	−21	6.6	5.2
5	−20	−21	−26	−17	−17	−10	− 9	(− 8)	− 7	−13	−18	−18	−16	6.8	4.8
4	−13	−11	−21	−12	−12	− 5	− 3	(− 2)	− 2	− 7	−12	−12	− 9	6.4	4.7
3	− 8	− 8	−14	− 7	− 7	0	+ 2	(+ 2)	+ 1	− 2	− 3	− 7	− 4	6.1	4.2
2	− 4	− 4	− 6	− 4	− 3	+ 6	+ 8	(+ 7)	+ 6	+ 2	0	− 4	0	5.6	4.5
1	+ 1	+ 2	− 2	+ 1	+ 1	+10	+12	(+12)	+11	+ 8	+ 3	0	+ 5	5.2	4.8
0	+ 4	+ 4	0	+ 5	+ 6	+15	+20	(+18)	+15	+14	+ 6	0	+ 9	5.5	6.2
Mean date	16	19	19	18	12	10	16	(19)	22	16	24	24	......	......	......
No. obs	3	4	6	9	6	6	2	0*	2	2	3	3	4.9	......	......

*The temperatures for August are interpolated.

It would not be proper to consider these figures as representing any other locality than the neighborhood of Paris. If the irregularities of temperature continue above the same as below, no matter how high we ascend in the atmosphere this shows that the general currents of air and the presence of clouds or haze control the temperatures. Such currents and moisture conditions change with the season, the relative position of land and water, and the latitude. The existence